



DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 39

[Docket No. FAA-2023-0663; Project Identifier AD-2023-00020-E]

RIN 2120-AA64

Airworthiness Directives; General Electric Company Turbofan Engines

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Notice of proposed rulemaking (NPRM).

SUMMARY: The FAA proposes to adopt a new airworthiness directive (AD) for certain General Electric Company (GE) GEnx-1B and GEnx-2B model turbofan engines. This proposed AD was prompted by a manufacturer investigation that revealed that certain stages 6-10 compressor rotor spools and forward seals were manufactured from powder metal material suspected to contain iron inclusion. This proposed AD would require the replacement of the affected stages 6-10 compressor rotor spools and forward seals. The FAA is proposing this AD to address the unsafe condition on these products.

DATES: The FAA must receive comments on this proposed AD by [INSERT DATE 45 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

ADDRESSES: You may send comments, using the procedures found in 14 CFR 11.43 and 11.45, by any of the following methods:

- Federal eRulemaking Portal: Go to [regulations.gov](https://www.regulations.gov). Follow the instructions for submitting comments.
- Fax: (202) 493-2251.
- Mail: U.S. Department of Transportation, Docket Operations, M-30, West Building Ground Floor, Room W12-140, 1200 New Jersey Avenue SE, Washington, DC 20590.
- Hand Delivery: Deliver to Mail address above between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.

AD Docket: You may examine the AD docket at [regulations.gov](https://www.regulations.gov) by searching for and locating Docket No. FAA-2023-0663; or in person at Docket Operations between 9 a.m.

and 5 p.m., Monday through Friday, except Federal holidays. The AD docket contains this NPRM, any comments received, and other information. The street address for Docket Operations is listed above.

Material Incorporated by Reference:

- For GE service information identified in this NPRM, contact General Electric Company, 1 Neumann Way, Cincinnati, OH 45215; phone: (513) 552-3272; email: aviation.fleetsupport@ge.com; website: ge.com.

- You may view this service information at the FAA, Airworthiness Products Section, Operational Safety Branch, 1200 District Avenue, Burlington, MA 01803. For information on the availability of this material at the FAA, call (817) 222-5110.

FOR FURTHER INFORMATION CONTACT: Alexei Marqueen, Aviation Safety Engineer, ECO Branch, FAA, 1200 District Avenue, Burlington, MA 01803; phone: (781) 238-7178; email: Alexei.T.Marqueen@faa.gov.

SUPPLEMENTARY INFORMATION:

Comments Invited

The FAA invites you to send any written relevant data, views, or arguments about this proposal. Send your comments to an address listed under ADDRESSES. Include “Docket No. FAA-2023-0663; Project Identifier AD-2023-00020-E” at the beginning of your comments. The most helpful comments reference a specific portion of the proposal, explain the reason for any recommended change, and include supporting data. The FAA will consider all comments received by the closing date and may amend this proposal because of those comments.

Except for Confidential Business Information (CBI) as described in the following paragraph, and other information as described in 14 CFR 11.35, the FAA will post all comments received, without change, to [regulations.gov](https://www.regulations.gov), including any personal information you provide. The agency will also post a report summarizing each substantive verbal contact received about this NPRM.

Confidential Business Information

CBI is commercial or financial information that is both customarily and actually treated as private by its owner. Under the Freedom of Information Act (FOIA) (5 U.S.C.

552), CBI is exempt from public disclosure. If your comments responsive to this NPRM contain commercial or financial information that is customarily treated as private, that you actually treat as private, and that is relevant or responsive to this NPRM, it is important that you clearly designate the submitted comments as CBI. Please mark each page of your submission containing CBI as "PROPIN." The FAA will treat such marked submissions as confidential under the FOIA, and they will not be placed in the public docket of this NPRM. Submissions containing CBI should be sent to Alexei Marqueen, Aviation Safety Engineer, ECO Branch, FAA, 1200 District Avenue, Burlington, MA 01803. Any commentary that the FAA receives which is not specifically designated as CBI will be placed in the public docket for this rulemaking.

Background

The FAA was notified by the manufacturer of the detection of iron inclusion in a high-pressure turbine stage 2 disk manufactured from the same powder metal material used to manufacture certain stages 6-10 compressor rotor spools and forward seals for GEnx-1B64/P2, GEnx-1B67/P2, GEnx-1B70/75/P2, GEnx-1B70/P2, GEnx-1B70C/P2, GEnx-1B74/75/P2, GEnx-1B76/P2, GEnx-1B76A/P2, and GEnx-2B67/P model turbofan engines. A manufacturer investigation determined that the iron inclusion was introduced during the manufacturing process from raw material filtering screens that had degraded, and certain stages 6-10 compressor rotor spools and forward seals manufactured using the same process may have reduced material properties and a lower fatigue life capability due to the iron inclusion. Further investigation by the manufacturer identified additional degraded filtering screens which had the potential to increase the population of parts that were subjected to iron inclusion during manufacturing. As a result of its investigation, GE published service information that specifies procedures for the removal and replacement of certain stages 6-10 compressor rotor spools and forward seals. This condition, if not addressed, could result in uncontained debris release, damage to the engine, and damage to the aircraft.

FAA's Determination

The FAA is issuing this NPRM after determining that the unsafe condition described previously is likely to exist or develop on other products of the same type design.

Related Service Information under 1 CFR Part 51

The FAA reviewed GE GENx-1B Service Bulletin 72-0515 R00, Initial Issue, dated January 31, 2023. The FAA also reviewed GE GENx-2B Service Bulletin 72-0452 R00, Initial Issue, dated January 31, 2023. This service information specifies procedures for removal and replacement of the stages 6-10 compressor rotor spool and forward seal. These documents are distinct since they apply to different engine models. This service information is reasonably available because the interested parties have access to it through their normal course of business or by the means identified in ADDRESSES.

Proposed AD Requirements in this NPRM

This proposed AD would require removal of the affected stages 6-10 compressor rotor spools and forward seals and replacement with a part eligible for installation.

Interim Action

The FAA considers that this proposed AD would be an interim action. If final action is later identified, the FAA might consider additional rulemaking.

Costs of Compliance

The FAA estimates that this AD, if adopted as proposed, would affect 13 engines installed on airplanes of U.S. registry. The FAA estimates that nine of the 13 engines will require replacing the stages 6-10 compressor rotor spool and four of the 13 engines will require replacing the forward seal.

The FAA estimates the following costs to comply with this proposed AD:

Estimated costs

Action	Labor Cost	Parts Cost	Cost per product	Cost on U.S. operators
Replace stages 6-10 compressor rotor spool	8 work-hours x \$85 per hour = \$680	\$841,088	\$841,768	\$7,575,912

Replace forward seal	8 work-hours x \$85 per hour = \$680	\$389,976	\$390,656	\$1,562,624
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Authority for this Rulemaking

Title 49 of the United States Code specifies the FAA’s authority to issue rules on aviation safety. Subtitle I, section 106, describes the authority of the FAA Administrator. Subtitle VII: Aviation Programs, describes in more detail the scope of the Agency’s authority.

The FAA is issuing this rulemaking under the authority described in Subtitle VII, Part A, Subpart III, Section 44701: General requirements. Under that section, Congress charges the FAA with promoting safe flight of civil aircraft in air commerce by prescribing regulations for practices, methods, and procedures the Administrator finds necessary for safety in air commerce. This regulation is within the scope of that authority because it addresses an unsafe condition that is likely to exist or develop on products identified in this rulemaking action.

Regulatory Findings

The FAA determined that this proposed AD would not have federalism implications under Executive Order 13132. This proposed AD would not have a substantial direct effect on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government.

For the reasons discussed above, I certify this proposed regulation:

- (1) Is not a “significant regulatory action” under Executive Order 12866,
- (2) Would not affect intrastate aviation in Alaska, and
- (3) Would not have a significant economic impact, positive or negative, on a substantial number of small entities under the criteria of the Regulatory Flexibility Act.

List of Subjects in 14 CFR Part 39

Air transportation, Aircraft, Aviation safety, Incorporation by reference, Safety.

The Proposed Amendment

Accordingly, under the authority delegated to me by the Administrator, the FAA proposes to amend 14 CFR part 39 as follows:

PART 39 - AIRWORTHINESS DIRECTIVES

1. The authority citation for part 39 continues to read as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701.

§ 39.13 [Amended]

2. The FAA amends § 39.13 by adding the following new airworthiness directive:

General Electric Company: Docket No. FAA-2023-0663; Project Identifier AD-2023-00020-E.

(a) Comments Due Date

The FAA must receive comments on this airworthiness directive (AD) by [INSERT DATE 45 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

(b) Affected ADs

None.

(c) Applicability

This AD applies to General Electric Company (GE) GEnx-1B64/P2, GEnx-1B67/P2, GEnx-1B70/75/P2, GEnx-1B70/P2, GEnx-1B70C/P2, GEnx-1B74/75/P2, GEnx-1B76/P2, GEnx-1B76A/P2, and GEnx-2B67/P model turbofan engines with an installed:

(1) Stages 6-10 compressor rotor spool having a part number (P/N) and serial number (S/N) listed in paragraph 4, Appendix - A, Table 1 of GE GEnx-1B Service Bulletin 72-0515, Initial Issue, dated January 31, 2023 (GEnx-1B 72-0515); or

(2) Forward seal having a P/N and S/N listed in paragraph 4, Appendix - A, Table 2 of GEnx-1B 72-0515; or

(3) Stages 6-10 compressor rotor spool having a P/N and S/N listed in paragraph 4, Appendix - A, Table 1 of GE GEnx-2B Service Bulletin 72-0452, Initial Issue, dated January 31, 2023. (GEnx-2B 72-0452); or

(4) Forward seal having a P/N and S/N listed in paragraph 4, Appendix - A, Table 2 of GENx-2B 72-0452.

(d) Subject

Joint Aircraft System Component (JASC) Code 7230, Turbine Engine Compressor Section; 7250, Turbine Section.

(e) Unsafe Condition

This AD was prompted by a manufacturer investigation that revealed certain stages 6-10 compressor rotor spools and forward seals were subject to iron inclusion introduced during the manufacturing process. The FAA is issuing this AD to prevent fracture and potential uncontained failure of certain stages 6-10 compressor rotor spools and forward seals. The unsafe condition, if not addressed, could result in uncontained debris release, damage to the engine, and damage to the aircraft.

(f) Compliance

Comply with this AD within the compliance times specified, unless already done.

(g) Required Actions

(1) For affected GENx-1B model turbofan engines, at the next piece-part exposure after the effective date of this AD, or before the affected stages 6-10 compressor rotor spool reaches the cyclic removal threshold listed in paragraph 4., Appendix – A, Table 1 of GENx-1B 72-0515, whichever occurs first, remove the affected stages 6-10 compressor rotor spool from service and replace with a part eligible for installation.

(2) For affected GENx-1B model turbofan engines, at the next piece-part exposure after the effective date of this AD, or before the affected forward seal exceeds the cyclic removal threshold listed in paragraph 4., Appendix – A, Table 2 of GENx-1B 72-0515, whichever occurs first, remove the affected forward seal from service and replace with a part eligible for installation.

(3) For affected GENx-2B model turbofan engines, at the next piece-part exposure after the effective date of this AD, or before the affected stages 6-10 compressor rotor spool exceeds the cyclic removal threshold listed in paragraph 4., Appendix – A, Table 1 of GENx-2B 72-0452, whichever occurs first, remove the affected stages 6-10 compressor rotor spool from service and replace with a part eligible for installation.

(4) For affected GEnx-2B model turbofan engines, at the next piece-part exposure after the effective date of this AD, or before the affected forward seal exceeds the cyclic removal threshold listed in paragraph 4., Appendix – A, Table 2 of GEnx-2B 72-0452, whichever occurs first, remove the affected forward seal from service and replace with a part eligible for installation.

(h) Definitions

(1) For the purpose of this AD, a “part eligible for installation” is any stages 6-10 compressor rotor spool or forward seal with a P/N and S/N not listed in paragraph 4, Appendix - A, Table 1 or paragraph 4, Appendix - A, Table 2 of GEnx-1B 72-0515 or GEnx-2B 72-0452.

(2) For the purpose of this AD, “piece-part exposure” is when the affected part is removed from the engine.

(i) Alternative Methods of Compliance (AMOCs)

(1) The Manager, ECO Branch, FAA, has the authority to approve AMOCs for this AD, if requested using the procedures found in 14 CFR 39.19. In accordance with 14 CFR 39.19, send your request to your principal inspector or local Flight Standards District Office, as appropriate. If sending information directly to the manager of the certification office, send it to the attention of the person identified in paragraph (j) of this AD and email to: ANE-AD-AMOC@faa.gov.

(2) Before using any approved AMOC, notify your appropriate principal inspector, or lacking a principal inspector, the manager of the local flight standards district office/certificate holding district office.

(j) Related Information

For more information about this AD, contact Alexei Marqueen, Aviation Safety Engineer, ECO Branch, FAA, 1200 District Avenue, Burlington, MA 01803; phone: (781) 238-7178; email: Alexei.T.Marqueen@faa.gov.

(k) Material Incorporated by Reference

(1) The Director of the Federal Register approved the incorporation by reference (IBR) of the service information listed in this paragraph under 5 U.S.C. 552(a) and 1 CFR part 51.

(2) You must use this service information as applicable to do the actions required by this AD, unless the AD specifies otherwise.

(i) GE GENx-1B Service Bulletin 72-0515, Initial Issue, dated January 31, 2023.

(ii) GE GENx-2B Service Bulletin 72-0452, Initial Issue, dated January 31, 2023.

(3) For GE service information identified in this AD, contact General Electric Company, 1 Neumann Way, Cincinnati, OH 45215; phone: (513) 552-3272; email: aviation.fleetsupport@ge.com; website: ge.com.

(4) You may view this service information at FAA, Airworthiness Products Section, Operational Safety Branch, 1200 District Avenue, Burlington, MA 01803. For information on the availability of this material at the FAA, call (817) 222-5110.

(5) You may view this service information that is incorporated by reference at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, email: fr.inspection@nara.gov, or go to: www.archives.gov/federal-register/cfr/ibr-locations.html.

Issued on April 1, 2023.

Christina Underwood, Acting Director,
Compliance & Airworthiness Division,
Aircraft Certification Service.

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